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# Improvements in Grades of Hogs Marketed

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## Abstract

The percentage of slaughter hogs that qualified for U.S. No. 1 or No. 2 grades rose dramatically between 1968 and 1980, according to the most recent U.S. Department of Agriculture nationwide sample. In 1980, nearly 96 percent of all barrows and gilts were U.S. No. 1 or No. 2, compared with 50 percent 12 years earlier. Hog producers are striving to raise leaner hogs to satisfy consumer preference.

Keywords: Hogs, meat grades, grade attributes, backfat thickness, carcass length, muscling

Hog producers are raising leaner hogs than in the late sixties, as measured by the current U.S. system for grading hog carcasses. The percentage of slaughter hogs that qualified for the U.S. No. 1 grade moved up dramatically between 1968 and 1980, a nationwide sample of the grades and measurements of slaughtered hogs confirms.<sup>1</sup> In 1980, 96 percent of all barrows and gilts were U.S. No. 1 or No. 2, compared with 50 percent 12 years earlier.

The objectives of the 1980 study were to determine the percentage of hog carcasses in each grade and to measure and analyze any change in grade attributes from previous studies. Previous studies were conducted in 1960-61 and 1967-68.

U.S. Department of Agriculture (USDA) pork carcass grades are based on the expected combined carcass yields of the four lean cuts (the ham, loin, picnic shoulder, and Boston butt) if the lean is of acceptable quality and the belly of acceptable thickness. Carcasses are graded U.S. Utility if the lean has an unacceptable level of quality and/or the belly is of unacceptable thickness. Grades measure differences in carcass cutability and reflect price differentials.

Demand preferences for pork products have changed during the past two decades; consumers now want leaner meats. During this period, the de-

mand for animal fats has also diminished because of cheaper and more plentiful vegetable oil substitutes. U.S. hog farmers have attempted to respond to these changes by improving breeds, cross-breeding, and changing production practices to produce leaner hogs.

## Development of Grade Standards

USDA's system of classifying and grading market hogs, formulated in 1918, has been revised several times to reflect changes in production and marketing conditions. The most recent revision (in 1968) of the U.S. standards for grades of barrow and gilt carcasses resulted in five grades. The U.S. No. 1 grade was revised upward to properly identify the improved pork carcasses then being produced; it included only carcasses with expected high yields and thick muscling with acceptable lean quality. The No. 1, No. 2, and No. 3 grades under pre-1968 standards were renamed No. 2, No. 3, and No. 4, respectively. Hogs not meeting standards for No. 1 through No. 4 were graded Utility. Their carcasses either did not meet the lean-meat quality requirements of the other four grades, or they were soft and oily.

## Grade-Determining Factors

Backfat thickness is a principal grade-determining factor and is an average of three measurements, including the skin, made opposite the first and last ribs and the last lumbar vertebra. The measurement of average backfat thickness may be adjusted if the distribution of fat on other parts of the carcass is

<sup>1</sup>Fifty U.S. meatpackers and their principal trade associations—the American Meat Institute and the National Meat Association—cooperated in producing this study. Merritt Pike of the Food Safety and Inspection Service, USDA, collected the field data at packing plants throughout 1980.

not that which is normally associated with the actual measurement. Carcass length or carcass weight is another major factor. Length is measured from the anterior point of the aitch bone to the anterior edge of the first rib next to the first vertebra. Carcass weight is based on a packer-style dressed carcass—split into two sides down the back, jowls attached, with head, ham facings, and leaf fat removed.

Based on carcasses weighing 120-255 pounds, USDA No. 1 grade hogs produce carcasses ranging from 1.3 inches and less of backfat with a carcass length of 27 inches to 1.6 inches of backfat with a carcass length of 36 inches. USDA No. 2 allows hogs an additional 0.3 inch of backfat, and USDA No. 3 allows hogs an additional 0.6 inch of backfat. For carcasses of other lengths or weights, one can determine average backfat thickness requirements by extending the lines shown in figure 1.

Muscling score is a third factor that determines the grade. The muscling score indicates the thickness of

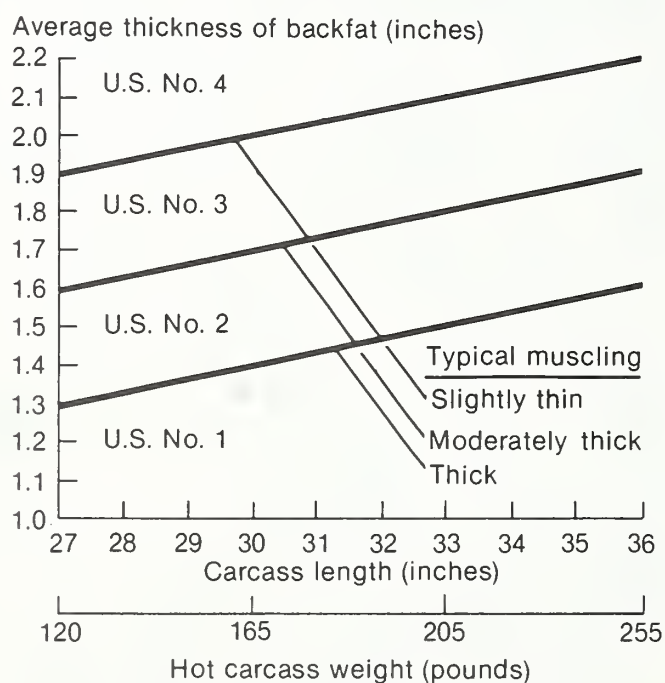
muscle in relation to skeletal size. The six degrees of muscling are: very thick, thick, moderately thick, slightly thin, thin, and very thin. The degree of muscling specified for each grade decreases from U.S. No. 1 through U.S. No. 4. Given carcasses of the same weight, fatter carcasses normally have less muscling. Typically, the minimum muscling scores of U.S. No. 1, No. 2, No. 3, and No. 4 grades, respectively, are: thick, moderately thick, slightly thin, and thin. Utility carcasses have unacceptable lean quality or belly thickness, or both.

## Procedures for Study

The sample design and grading procedures for the 1967-68 and 1980 studies were similar. First, researchers systematically selected a sample of hog slaughter plants in the major hog-producing States. One USDA meat grader visited a randomly selected sample of 62 meatpacking plants. The grader visited a plant twice during the year, once in the 1st or 2nd quarter and then again in the 3rd or 4th quarter. The grader measured and graded a sample of 30 market hogs per hour for a one-kill shift. During the 1980 survey, just over 36,000 barrow or gilt carcasses were measured and graded, compared with 57,000 carcasses at 60 plants in the 1967-68 survey. Compared with total commercial barrow and gilt slaughter, about 1 out of 1,250 hogs slaughtered was graded in 1967-68, and 1 out of 2,500 in 1980.

Figure 1

### Relationship between Average Thickness of Backfat, Carcass Length or Weight, and Grade for Carcasses with Muscling Typical of Their Degree of Fatness



## Grade Consist

In 1980, about 96 percent of the carcasses were graded U.S. No. 1 and 2, compared with 50 percent in 1967-68. Over the 12-year period, carcasses graded U.S. No. 1 increased about 64 percentage points, to 72 percent. The grade distributions of hogs marketed, based on these samples, are as follows:

	1967-68 <sup>1</sup>	1980
	Percent	
1	8.2	71.7
2	42.1	24.2
3	35.7	3.7
4	12.2	.3
Utility	1.8	.1

<sup>1</sup>Source: U.S. Department of Agriculture, *Improvements in Grades of Hogs Slaughtered From 1960-61 To 1967-68*, Marketing Research Report No. 849, May 1969.



Grading the carcasses in 1980 solely on the basis of backfat thickness in relation to carcass length resulted in grading 72.9 percent as U.S. No. 1, 23.0 percent as U.S. No. 2, 3.6 percent as U.S. No. 3, 0.4 percent as U.S. No. 4, and 0.1 percent as Utility.

## Seasonality in Grade Distribution

The grade distribution of hogs sampled in the Corn Belt showed no consistent seasonal pattern between years. In 1980, the percentage of hogs graded U.S. No. 1 increased from 66 percent in January-March to 76 percent in October-December. Conversely, the percentage of hogs graded U.S. No. 2 decreased from 30 percent in the first quarter to 21 percent in the fourth quarter. The seasonal analysis was limited to the 18,900 hogs sampled at 30 plants in the Corn Belt (as slaughter plants in other regions were not sampled in all four quarters). The seasonal grade distribution is probably associated with the buildup or liquidation phase of the hog cycle at the time and with the short-term marginal profitability of feeding to heavier weights.

## Seasonal variation in 1980 grade distribution<sup>1</sup>

U.S. Grade	Quarter			
	1	2	3	4
	Percent			
1	66	69	75	76
2	30	25	22	21
3	*	5	3	2
4	*	1	*	*
Utility	*	*	*	*

<sup>1</sup>Based on 30 Corn Belt plants.

\*Less than 0.5 percent.

## Improvements in Grade-Determining Factors

Measurements of the carcass length increased and backfat thickness decreased during the 12-year period (figs. 2 and 3). Between 1967-68 and 1980, average carcass length increased about 0.5 inch; average backfat thickness decreased over 0.25 inch.

Figure 2

### Distribution of Carcass Length

Percentage of carcasses

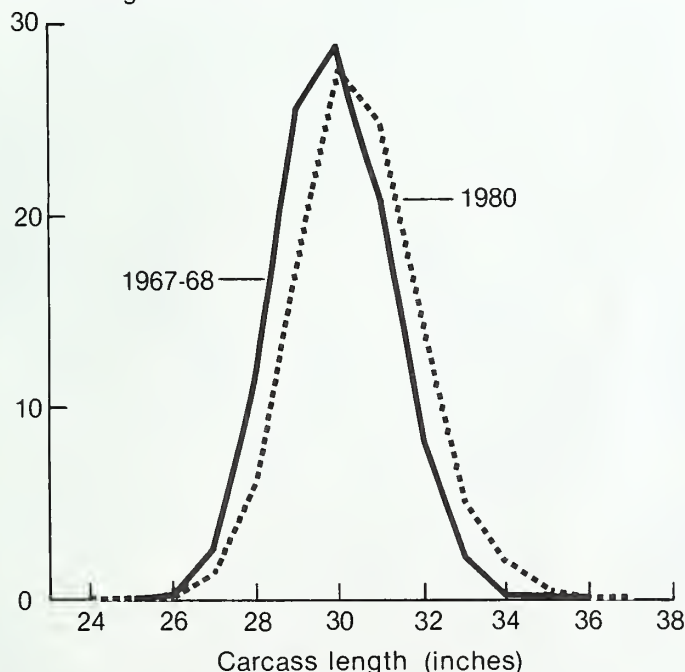
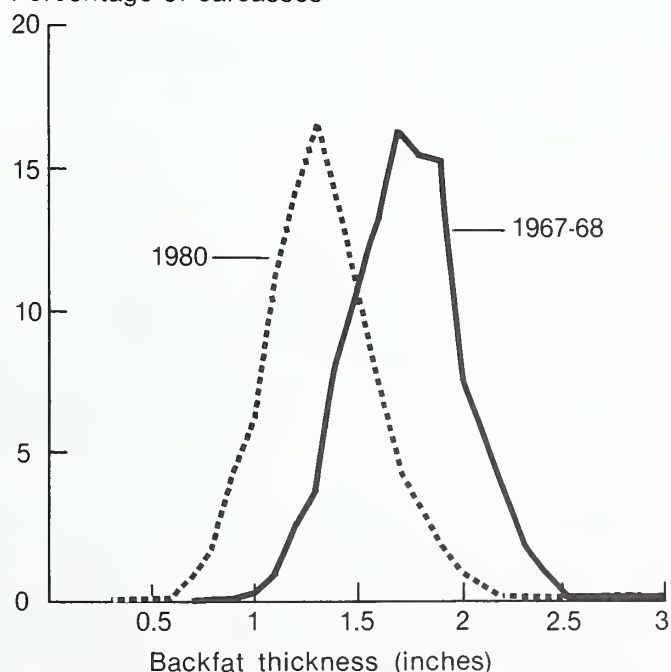


Figure 3

### Distribution of Average Backfat Thickness

Percentage of carcasses



For U.S. No. 1 hogs, average carcass length increased from 30.4 inches to 31.0 inches; average backfat thickness decreased from 1.51 inches to 1.22 inches.

U.S. Grade	Average carcass length		Average thickness	
	1967-68 <sup>1</sup>	1980	1967-68 <sup>1</sup>	1980
	Inches			
1	30.4	31.0	1.51	1.22
2	30.3	30.8	1.79	1.56
3	30.4	30.8	2.13	1.94

<sup>1</sup>Source: U.S. Department of Agriculture, *Improvements in Grades of Hogs Slaughtered From 1960-61 To 1967-68*, Marketing Research Report No. 849, May 1969.

## Implications

Between 1967-68 and 1980, the percentage of carcasses graded as U.S. No. 1 increased significantly to over 70 percent of all hogs slaughtered. Hogs graded as No. 1 or No. 2 accounted for nearly 96 percent of all hogs slaughtered during 1980.

Given the high proportion of hogs now in the top grade, several possibilities arise. First, pork products may not improve further under present standards. An ideal grading system should classify together products with uniform characteristics determining their value so that price can reflect differences in value and provide incentives for improvement. In the past, the grading system has enabled higher prices to encourage grade improvement. If the system is to continue to differentiate among value, quality, and price, it may need to be modified so additional incentives can improve grade attributes. Currently, for the limited prices quoted, there is less than \$1 difference per hundredweight between grades 1 and 2.

The potential for improving the grade-determining factors may be limited. The distribution of carcass length and backfat thickness indicates we may be nearing a practical minimum for backfat thickness, as packers want a minimum amount of backfat to protect the lean. Increased carcass length may be the only feasible avenue for improvement. This may produce larger, more desirable cuts and reduce processing cost per pound.

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